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Chapter 1: The Start of a STEM Revolution

FRC 6328 - Mechanical Advantage was founded in June 2016 as a community team and non-profit organization, the Littleton STEM Educational Foundation. Prior to our team's existence, STEM opportunities outside of the classroom were minimal, with no FIRST teams for Littleton students to join. Our goal was to change this by starting a STEM revolution in our community. Our team motto, "Good is the Enemy of Great," has served as our guiding principle, making sure to not settle for anything less than our best.

Our team hosted the first student meeting with 11 members during the summer of 2016. Our team met all offseason, training members in CAD and programming as well as attending 13 outreach events, including our first annual Pasta Dinner to get our name out in the community.

The team's offseason momentum carried through to 2017, taking our team all the way to the World Championship. Our team was inspired, ecstatic, and ready to work all summer and fall to prepare for the 2018 season. However, bad news was waiting for us back home. Despite being a community team, we worked out of 2 classrooms at Littleton High School. However, the school was expanding and needed the space back. Moving out day was one of the toughest for our team. We had no idea if a 2018 season was even possible anymore.

This setback did not stop us, though. We knew we needed a space to work, and we knew we needed to get the attention of the community to make this happen. Our strategy was clear: grow this program so large that the community simply cannot ignore us.

First, we attended every community event we could. Our team participated in 31 outreach events in 2017, reaching the Littleton community, as well as the greater Boston area through events like Boston Youth Expo, where we shared FIRST with underprivileged Boston students. We also started 10 of our own outreach events, including STEAM Careers Night, the Girl Scouts Robotics Badge program and the Best Buddies STEM events. The Best Buddies events were started when a team member learned that special needs students were interested in learning about STEM, but didn't have opportunities to do so. We hosted 2 workshops for Best Buddies members, teaching them about 3D printing and different programming platforms.

Next we incorporated FLL into our team. We knew a direct FLL-to-FRC feeder was the key to long-term sustainability. Running 3 teams without a workspace was a major challenge, but we did not let that slow us down. Although classroom space was not available in the local schools, we worked with the Littleton Middle School principal to find a space that would work. She graciously offered our team use of hallway space for our meetings. Twice a week we carried 3 tables and countless boxes of Legos down to our little hallway space, but it was all worth it to see how inspired our 3 teams were. One of our FLL members with special needs had always struggled to fit in at school, but found his home in FIRST with the support of our FRC members. He decided to make a trip out to Dorchester with the FRC team to meet with CYSTEM, a

sports-based youth organization, about incorporating Lego Robotics into their program. When discussing with the group, this student proudly announced, “Robotics is the best thing to ever happen to Littleton.’ It was at that moment we knew we were on to something big.

We also retained a close partnership with the 4 Bolton FLL teams, hosting a joint scrimmage and inviting them to our inaugural FLL Practice Interviews Day. This partnership led to every Littleton and Bolton 8th grader participating in our FLL to FRC transition program, and joining our FRC team for the 2018 season.

All these efforts did not go unnoticed, and caught the attention of the Littleton Selectmen, who connected us with Patriot Beverages. In December 2017, Patriot Beverages donated a 4,200 SF workspace to our team, equipped with a machine shop space, robot assembly room and practice field area.

Realizing this space was perfect for holding FIRST events, we decided to host an FLL Jr. Expo. We hosted 6 FLL Jr. teams, and set up FLL, FRC and FTC demos to showcase all levels of FIRST. We had over 200 community members attend this event, many interested in starting new FLL Jr. teams. The STEM revolution in our community was happening right before our eyes, but we knew this was no time to slow down.

Chapter 2: The STEM Hub

By the 2018 offseason, 6328 was off the ground running. With a secure workspace, effective FLL to FRC feeder program, and well known presence in our community, we had set a solid foundation for continued growth. We set our focus on turning our team headquarters into a STEM Hub in the community.

We placed a major emphasis on FLL in 2018, creating two new student coach positions for FRC members in addition to our mentor-in-training roles. We started the season with a summer program, where teams played FLL PowerUP, a custom game created by 6328 members that was based on the 2018 FRC Game. This game was designed to be a simple introduction to Lego Robotics, while also exposing students to FRC. During the Into Orbit season, our FRC members mentored the 3 Littleton and 4 Bolton FLL teams, supporting the teams all the way to the MA State Championship. Additionally, we ran the Bolton-Littleton FLL Scrimmage with 7 teams, our FLL Practice Interviews Day with 18 teams, as well an FLL Qualifier for 28 teams. To further develop our workspace into a STEM Hub, we also hosted a K-3 STEM Night and a Cub Scout Robotics Elective, incorporating FIRST demos into both events. It was incredible to see the 6328 Hub buzzing with STEM activity all season long.

We also focused efforts on FLL Jr. in 2018. After meeting many families interested in the program at our Expo, we hosted an information session and developed a How-To Guide to help new teams form. This led to the start of 4 new FLL Jr. teams in town, 1 of which is the 6328 house team. We partnered with NE FIRST Regional Director Steve Cremer to hold an FLL Jr. Coach training as well. Furthermore, we started a 2019 interest list for FLL Jr., which we will use

to assemble teams in the summer. We are projected to have at least 3 new teams start up in 2019.

In addition to FLL efforts, we focused on expanding our community outreach program. We added FTC to our 5-tier outreach program, and hosted joint demos with FTC Team 12897. To encourage sustainability among new teams, we developed a FTC versus FRC decision guide. Our goal is to help new teams pick the right FIRST program for them, so they can keep their team running for years to come. We continued to assist FRC 6731 with outreach and fundraising efforts, as well as began assisting FRC 6844 with outreach and team sustainability. FRC 6844 is a community team based in UT, where the closest team is over an hour away. The team reached out for advice on how to make their team more sustainable. We discussed strategies with the team from our FRC Team Sustainability guide, including implementing their own FLL to FRC feeder program for 2019.

In addition to attending our regular outreach events, we added new events to the list in 2018, including demos at the MA Dept. of Environmental Protection, Touch Tomorrow, Geek is Glam and the Acton Discovery Museum, totalling 29 community events in 2018. One notable event was the Best Buddies Friendship Walk. After hearing about the success of our Best Buddies STEM Events, the MA Best Buddies Director reached out to invite our team to this new event. We demoed our 2018 robot for participants, who were ecstatic to operate the robot's cube intake and elevator. It was an incredibly inspiring day for our team.

The work of starting up our FLL to FRC Transition program in 2017 really started to pay off in 2018. We had all 8th grade FLL members from Littleton and Bolton sign up for the program, and 14/15 decided to join FRC for the 2019 season. Members in the program got exposure to FRC by trying out pit crew and drive team roles at an offseason competition, and by attending weekly CAD, programming, scouting and machining sessions. We held our 2nd-annual bucket hat ceremony at the conclusion of the program to welcome new members to the team. In only 2 years of running the program, our FRC team is currently 51% FLL alumni, making up 20 of the 39 members.

It was rare to find a day that the 6328 HQ was not lit up with STEM activity in 2018. Although we were faced with challenges that felt insurmountable at the time, we are proud to say we embraced the obstacles, and worked hard to get our team where it is today.

Chapter 3: The Smallest Moments Make the Biggest Difference

When thinking about our team's journey, it is the little moments that remind us our team is so much bigger than the robots we build. Moments like when our driver said to our coach "thank you for changing my life," after a mechanism she worked tirelessly on was successful at Worlds. Or when one of our FLL students with a communication disability gained the confidence to MC FLL matches, and when the teacher he's been working with for years sees the video, tears of amazement pour down her face.

Or the pride we feel when we do our part to break the stigma surrounding mental health, setting up relaxation rooms at FLL events, designed to soothe anxious feelings and bring students' minds back to the present. When an FLL team at our qualifier was crying after getting knocked out in the elimination tournament and used the room to calm down, we knew it was well worth the time and effort spent.

These moments can't be captured in business plans, documentation or even videos, but they are truly at the heart of this team. Although these moments are fleeting, they add up one by one to make our goal of revolutionizing STEM in our community a reality. We have made major strides, but we know there is more to be done, and we can't wait to start writing the next chapter of our story.